



#5

SEQUENCE LISTING

<110> Westphal, Ryan S.
Feder, John N.
Ramanathan, Chandra S.
Mintier, Gabriel A.

<120> NUCLEIC ACID MOLECULES AND POLYPEPTIDES FOR A HUMAN CATION CHANNEL
POLYPEPTIDE

<130> D0187NP
<140> 10/029,677
<141> 2001-12-21

<150> US 60/257,865
<151> 2000-12-21

<160> 24

<170> PatentIn version 3.0

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<210> 1
<211> 2186
<212> DNA
<213> Homo sapiens
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<220>
<221> CDS
<222> (20) .. (2011)

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<221> misc_feature
<222> (2150)..(2150)
<223> wherein "n" equals A, C, G, or T.
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Met Thr Glu Lys Thr Asn Gly Val Lys Ser Ser
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Gly Lys Asp Asp His Arg Thr Ser Ser Arg Pro His Ser Ala Ala Asp
      30           35           40

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gat gac acc tcc tca gaa ctg cag agg ctg gca gac gtg gat gcc cca 196
 Asp Asp Thr Ser Ser Glu Leu Gln Arg Leu Ala Asp Val Asp Ala Pro
 45 50 55

cag cag gga agg agt ggc ttc cgc agg ata gtt cgc ctg gtg ggg atc 244
 Gln Gln Gly Arg Ser Gly Phe Arg Arg Ile Val Arg Leu Val Gly Ile
 60 65 70 75

atc aga gaa tgg gcc aac aag aat ttc cga gag gag gaa cct agg cct Ile Arg Glu Trp Ala Asn Lys Asn Phe Arg Glu Glu Glu Pro Arg Pro	80	85	90	292	
gac tca ttc ctc gag cgt ttt cgt ggg cct gaa ctc cag act gtg acc Asp Ser Phe Leu Glu Arg Phe Arg Gly Pro Glu Leu Gln Thr Val Thr	95	100	105	340	
aca cag gag ggg gat ggc aaa ggc gac aag gat ggc gag gac aaa ggc Thr Gln Glu Gly Asp Gly Lys Asp Lys Asp Gly Glu Asp Lys Gly	110	115	120	388	
acc aag aag aaa ttt gaa cta ttt gtc ttg gac cca gct ggg gat ttg Thr Lys Lys Lys Phe Glu Leu Phe Val Leu Asp Pro Ala Gly Asp Leu	125	130	135	436	
tac tac tgc tgg cta ttt gtc att gcc atg ccc gtc ctt tac aac tgg Tyr Tyr Cys Trp Leu Phe Val Ile Ala Met Pro Val Leu Tyr Asn Trp	140	145	150	155	484
tgc ctg ctg gtg gcc aga gcc tgc ttc agt gac cta cag aaa ggc tac Cys Leu Leu Val Ala Arg Ala Cys Phe Ser Asp Leu Gln Lys Gly Tyr	160	165	170	532	
tac ctg gtg tgg ctg gtg ctg gat tat gtc tca gat gtg gtc tac att Tyr Leu Val Trp Leu Val Leu Asp Tyr Val Ser Asp Val Val Tyr Ile	175	180	185	580	
gcg gac ctc ttc atc cga ttg cgc aca ggt ttc ctg gag cag ggg ctg Ala Asp Leu Phe Ile Arg Leu Arg Thr Gly Phe Leu Glu Gln Gly Leu	190	195	200	628	
ctg gtc aaa gat acc aag aaa ctg cga gac aac tac atc cac acc ctg Leu Val Lys Asp Thr Lys Lys Leu Arg Asp Asn Tyr Ile His Thr Leu	205	210	215	676	
cag ttc aag ctg gat gtg gct tcc atc atc ccc act gac ctg atc tat Gln Phe Lys Leu Asp Val Ala Ser Ile Ile Pro Thr Asp Leu Ile Tyr	220	225	230	235	724
ttt gct gtg gac atc cac agc cct gag gtg cgc ttc aac cgc ctg ctg Phe Ala Val Asp Ile His Ser Pro Glu Val Arg Phe Asn Arg Leu Leu	240	245	250	772	
cac ttt gcc cgc atg ttt gag ttc ttt gac cgg aca gag aca cgc acc His Phe Ala Arg Met Phe Glu Phe Phe Asp Arg Thr Glu Thr Arg Thr	255	260	265	820	
aac tac cct aac atc ttc cgc atc agc aac ctt gtc ctc tac atc ttg Asn Tyr Pro Asn Ile Phe Arg Ile Ser Asn Leu Val Leu Tyr Ile Leu	270	275	280	868	
gtc atc atc cac tgg aat gcc tgc atc tat tat gcc atc tcc aaa tcc Val Ile Ile His Trp Asn Ala Cys Ile Tyr Tyr Ala Ile Ser Lys Ser	285	290	295	916	
ata ggc ttt ggg gtc gac acc tgg gtt tac cca aac atc act gac cct				964	

Ile Gly Phe Gly Val Asp Thr Trp Val Tyr Pro Asn Ile Thr Asp Pro				
300	305	310	315	
gag tat ggc tac ctg gct agg gaa tac atc tat tgc ctt tac tgg tcc				1012
Glu Tyr Gly Tyr Leu Ala Arg Glu Tyr Ile Tyr Cys Leu Tyr Trp Ser				
320	325	330		
aca ctg act ctc act acc att ggg gag aca cca ccc cct gta aag gat				1060
Thr Leu Thr Leu Thr Ile Gly Glu Thr Pro Pro Pro Val Lys Asp				
335	340	345		
gag gag tac cta ttt gtc atc ttt gac ttc ctg att ggc gtc ctc atc				1108
Glu Glu Tyr Leu Phe Val Ile Phe Asp Phe Leu Ile Gly Val Leu Ile				
350	355	360		
ttt gcc acc atc gtg gga aat gtg ggc tcc atg atc tcc aac atg aat				1156
Phe Ala Thr Ile Val Gly Asn Val Gly Ser Met Ile Ser Asn Met Asn				
365	370	375		
gcc acc cgg gca gag ttc cag gct aag atc gat gcc gtg aaa cac tac				1204
Ala Thr Arg Ala Glu Phe Gln Ala Lys Ile Asp Ala Val Lys His Tyr				
380	385	390	395	
atg cag ttc cga aag gtc agc aag ggg atg gaa gcc aag gtc att agg				1252
Met Gln Phe Arg Lys Val Ser Lys Gly Met Glu Ala Lys Val Ile Arg				
400	405	410		
tgg ttt gac tac ttg tgg acc aat aag aac gta gtg gat gag cga gaa				1300
Trp Phe Asp Tyr Leu Trp Thr Asn Lys Lys Thr Val Asp Glu Arg Glu				
415	420	425		
att ctc aag aat ctg cca gcc aag ctc agg gct gag ata gcc acc aat				1348
Ile Leu Lys Asn Leu Pro Ala Lys Leu Arg Ala Glu Ile Ala Thr Asn				
430	435	440		
gtc cac ttg tcc aca ctc aag aaa gtg cgc atc ttc cat gat tgt gag				1396
Val His Leu Ser Thr Leu Lys Val Arg Ile Phe His Asp Cys Glu				
445	450	455		
gct ggc ctg ctg gta gag ctg gta ctg aaa ctc cgt cct cag gtc ttc				1444
Ala Gly Leu Leu Val Glu Leu Val Leu Lys Leu Arg Pro Gln Val Phe				
460	465	470	475	
agt cct ggg gat tac att tgc cgc aaa ggg gac atc ggc aag gag atg				1492
Ser Pro Gly Asp Tyr Ile Cys Arg Lys Gly Asp Ile Gly Lys Glu Met				
480	485	490		
tac atc att aag gag ggc aaa ctg gca gtg gtg gct gat gat ggt gtg				1540
Tyr Ile Ile Lys Glu Gly Lys Leu Ala Val Val Ala Asp Asp Gly Val				
495	500	505		
act cag tat gct ctg ctg gct gga agc tgc ttt ggc gag atc agt				1588
Thr Gln Tyr Ala Leu Leu Ser Ala Gly Ser Cys Phe Gly Glu Ile Ser				
510	515	520		
atc ctt aac att aag ggc agt aaa atg ggc aat cga cgc aca gct aat				1636
Ile Leu Asn Ile Lys Gly Ser Lys Met Gly Asn Arg Arg Thr Ala Asn				

525	530	535	
atc cgc agc ctg ggc tac tca gat ctc ttc tgc ttg tcc aag gat gat Ile Arg Ser Leu Gly Tyr Ser Asp Leu Phe Cys Leu Ser Lys Asp Asp	540	545	1684
	550	555	
ctt atg gaa gct gtg act gag tac cct gat gcc aag aaa gtc cta gaa Leu Met Glu Ala Val Thr Glu Tyr Pro Asp Ala Lys Lys Val Leu Glu	560	565	1732
		570	
gag agg ggt cgg gag atc ctc atg aag gag gga ctg ctg gat gag aac Glu Arg Gly Arg Glu Ile Leu Met Lys Glu Gly Leu Leu Asp Glu Asn	575	580	1780
		585	
gaa gtg gca acc agc atg gag gtc gac gtg cag gag aag cta ggg cag Glu Val Ala Thr Ser Met Glu Val Asp Val Gln Glu Lys Leu Gly Gln	590	595	1828
		600	
ctg gag acc aac atg gaa acc ttg tac act cgc ttt ggc cgc ctg ctg Leu Glu Thr Asn Met Glu Thr Leu Tyr Thr Arg Phe Gly Arg Leu Leu	605	610	1876
		615	
gct gag tac acg ggg gcc cag cag aag ctc aag cag cgc atc aca gtt Ala Glu Tyr Thr Gly Ala Gln Gln Lys Leu Lys Gln Arg Ile Thr Val	620	625	1924
		630	635
ctg gaa acc aag atg aaa cag aac aat gaa gat gac tac ctg tct gat Leu Glu Thr Lys Met Lys Gln Asn Asn Glu Asp Asp Tyr Leu Ser Asp	640	645	1972
		650	
ggg atg aac agc cct gag ctg gct gct gac gag cca taagacctgg Gly Met Asn Ser Pro Glu Leu Ala Ala Asp Glu Pro	655	660	2021
ggcccaactg cctctccagc attggccttg gccttgatcc cagaagctag aggagctatt			2081
tagatctccg gatttacatg cattaccctc atgttccctg aattctccca aaagtctctc			2141
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<pre> Asn His His Ala Pro Pro Ala Ile Lys Ala Asn Gly Lys Asp Asp His 20 25 30 </pre>			

Arg Thr Ser Ser Arg Pro His Ser Ala Ala Asp Asp Asp Thr Ser Ser
35 40 45

Glu Leu Gln Arg Leu Ala Asp Val Asp Ala Pro Gln Gln Gly Arg Ser
50 55 60

Gly Phe Arg Arg Ile Val Arg Leu Val Gly Ile Ile Arg Glu Trp Ala
65 70 75 80

Asn Lys Asn Phe Arg Glu Glu Pro Arg Pro Asp Ser Phe Leu Glu
85 90 95

Arg Phe Arg Gly Pro Glu Leu Gln Thr Val Thr Thr Gln Glu Gly Asp
100 105 110

Gly Lys Gly Asp Lys Asp Gly Glu Asp Lys Gly Thr Lys Lys Lys Phe
115 120 125

Glu Leu Phe Val Leu Asp Pro Ala Gly Asp Leu Tyr Tyr Cys Trp Leu
130 135 140

Phe Val Ile Ala Met Pro Val Leu Tyr Asn Trp Cys Leu Leu Val Ala
145 150 155 160

Arg Ala Cys Phe Ser Asp Leu Gln Lys Gly Tyr Tyr Leu Val Trp Leu
165 170 175

Val Leu Asp Tyr Val Ser Asp Val Val Tyr Ile Ala Asp Leu Phe Ile
180 185 190

Arg Leu Arg Thr Gly Phe Leu Glu Gln Gly Leu Leu Val Lys Asp Thr
195 200 205

Lys Lys Leu Arg Asp Asn Tyr Ile His Thr Leu Gln Phe Lys Leu Asp
210 215 220

Val Ala Ser Ile Ile Pro Thr Asp Leu Ile Tyr Phe Ala Val Asp Ile
225 230 235 240

His Ser Pro Glu Val Arg Phe Asn Arg Leu Leu His Phe Ala Arg Met
245 250 255

Phe Glu Phe Phe Asp Arg Thr Glu Thr Arg Thr Asn Tyr Pro Asn Ile

260

265

270

Phe Arg Ile Ser Asn Leu Val Leu Tyr Ile Leu Val Ile Ile His Trp
275 280 285

Asn Ala Cys Ile Tyr Tyr Ala Ile Ser Lys Ser Ile Gly Phe Gly Val
290 295 300

Asp Thr Trp Val Tyr Pro Asn Ile Thr Asp Pro Glu Tyr Gly Tyr Leu
305 310 315 320

Ala Arg Glu Tyr Ile Tyr Cys Leu Tyr Trp Ser Thr Leu Thr Leu Thr
325 330 335

Thr Ile Gly Glu Thr Pro Pro Pro Val Lys Asp Glu Glu Tyr Leu Phe
340 345 350

Val Ile Phe Asp Phe Leu Ile Gly Val Leu Ile Phe Ala Thr Ile Val
355 360 365

Gly Asn Val Gly Ser Met Ile Ser Asn Met Asn Ala Thr Arg Ala Glu
370 375 380

Phe Gln Ala Lys Ile Asp Ala Val Lys His Tyr Met Gln Phe Arg Lys
385 390 395 400

Val Ser Lys Gly Met Glu Ala Lys Val Ile Arg Trp Phe Asp Tyr Leu
405 410 415

Trp Thr Asn Lys Lys Thr Val Asp Glu Arg Glu Ile Leu Lys Asn Leu
420 425 430

Pro Ala Lys Leu Arg Ala Glu Ile Ala Thr Asn Val His Leu Ser Thr
435 440 445

Leu Lys Lys Val Arg Ile Phe His Asp Cys Glu Ala Gly Leu Leu Val
450 455 460

Glu Leu Val Leu Lys Leu Arg Pro Gln Val Phe Ser Pro Gly Asp Tyr
465 470 475 480

Ile Cys Arg Lys Gly Asp Ile Gly Lys Glu Met Tyr Ile Ile Lys Glu
485 490 495

Gly Lys Leu Ala Val Val Ala Asp Asp Gly Val Thr Gln Tyr Ala Leu
500 505 510

Leu Ser Ala Gly Ser Cys Phe Gly Glu Ile Ser Ile Leu Asn Ile Lys
515 520 525

Gly Ser Lys Met Gly Asn Arg Arg Thr Ala Asn Ile Arg Ser Leu Gly
530 535 540

Tyr Ser Asp Leu Phe Cys Leu Ser Lys Asp Asp Leu Met Glu Ala Val
545 550 555 560

Thr Glu Tyr Pro Asp Ala Lys Lys Val Leu Glu Glu Arg Gly Arg Glu
565 570 575

Ile Leu Met Lys Glu Gly Leu Leu Asp Glu Asn Glu Val Ala Thr Ser
580 585 590

Met Glu Val Asp Val Gln Glu Lys Leu Gly Gln Leu Glu Thr Asn Met
595 600 605

Glu Thr Leu Tyr Thr Arg Phe Gly Arg Leu Leu Ala Glu Tyr Thr Gly
610 615 620

Ala Gln Gln Lys Leu Lys Gln Arg Ile Thr Val Leu Glu Thr Lys Met
625 630 635 640

Lys Gln Asn Asn Glu Asp Asp Tyr Leu Ser Asp Gly Met Asn Ser Pro
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Glu Leu Ala Ala Ala Asp Glu Pro
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<210> 4
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22

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cgggatccga ggccggaaatct tggatgttt

29

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<220>
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<210> 7
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<400> 7
tcactgaagc aggctct

17

<210> 8
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<212> DNA
<213> Artificial Sequence

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<400> 8
ttactggtcc acactga

17

<210> 9
<211> 17
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<213> Artificial Sequence

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<400> 9
tcagtgtgga ccagtaa

17

<210> 10
<211> 20
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<213> Artificial Sequence

<220>
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<210> 11
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<213> Artificial Sequence

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21

<210> 13
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<400> 13
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20

<210> 14
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<210> 15
<211> 732
<212> PRT
<213> Oryctolagus cuniculus

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Trp Arg Arg Ser Ala Ala Thr Arg Arg Ser Arg Arg Cys Leu Lys Thr
20 25 30

Lys Arg Lys Arg Trp Ser Ser Gly Lys Gly Thr Pro Met Gln Ser Thr
35 40 45

Gln Cys Glu Thr Arg Arg Ala Gln Thr Pro Cys Glu Ser Thr Gly
50 55 60

His Thr Trp Arg Met Thr Glu Lys Ser Asn Gly Val Lys Ser Ser Pro
65 70 75 80

Ala Asn Asn His Asn Asn His Val Pro Ala Thr Ile Lys Ala Asn Gly
85 90 95

Lys Asp Glu Ser Arg Thr Arg Ser Arg Pro Gln Ser Ala Ala Asp Asp
100 105 110

Asp Thr Ser Ser Glu Leu Gln Arg Leu Ala Glu Met Asp Ala Pro Gln
115 120 125

Gln Arg Arg Gly Gly Phe Arg Arg Ile Val Arg Leu Val Gly Val Ile
130 135 140

Arg Gln Trp Ala Asn Arg Asn Phe Arg Glu Glu Ala Arg Pro Asp
145 150 155 160

Ser Phe Leu Glu Arg Phe Arg Gly Pro Glu Leu Gln Thr Val Thr Thr

165 170 175

Gln Gln Gly Asp Gly Lys Gly Asp Lys Asp Gly Asp Gly Lys Gly Thr
180 185 190

Lys Lys Lys Phe Glu Leu Phe Val Leu Asp Pro Ala Gly Asp Trp Tyr
195 200 205

Tyr Arg Trp Leu Phe Val Ile Ala Met Pro Val Leu Tyr Asn Trp Cys
210 215 220

Leu Leu Val Ala Arg Ala Cys Phe Ser Asp Leu Gln Arg Gly Tyr Phe
225 230 235 240

Leu Val Trp Leu Val Leu Asp Tyr Phe Ser Asp Val Val Tyr Ile Ala
245 250 255

Asp Leu Phe Ile Arg Leu Arg Thr Gly Phe Leu Glu Gln Gly Leu Leu
260 265 270

Val Lys Asp Pro Lys Lys Leu Arg Asp Asn Tyr Ile His Thr Leu Gln
275 280 285

Phe Lys Leu Asp Val Ala Ser Ile Ile Pro Thr Asp Leu Ile Tyr Phe
290 295 300

Ala Val Gly Ile His Asn Pro Glu Leu Arg Phe Asn Arg Leu Leu His
305 310 315 320

Phe Ala Arg Met Phe Glu Phe Phe Asp Arg Thr Glu Thr Arg Thr Ser
325 330 335

Tyr Pro Asn Ile Phe Arg Ile Ser Asn Leu Val Leu Tyr Ile Leu Val
340 345 350

Ile Ile His Trp Asn Ala Cys Ile Tyr Tyr Ala Ile Ser Lys Ser Ile
355 360 365

Gly Phe Gly Val Asp Thr Trp Val Tyr Pro Asn Ile Thr Asp Pro Glu
370 375 380

Tyr Gly Tyr Leu Ala Arg Glu Tyr Ile Tyr Cys Leu Tyr Trp Ser Thr
385 390 395 400

Leu Thr Leu Thr Thr Ile Gly Glu Thr Pro Pro Pro Val Lys Asp Glu
405 410 415

Glu Tyr Leu Phe Val Ile Phe Asp Phe Leu Ile Gly Val Leu Ile Phe
420 425 430

Ala Thr Ile Val Gly Asn Val Gly Ser Met Ile Ser Asn Met Asn Ala
435 440 445

Thr Arg Ala Glu Phe Gln Ala Lys Ile Asp Ala Val Lys His Tyr Met
450 455 460

Gln Phe Arg Lys Val Ser Lys Glu Met Glu Ala Lys Val Ile Lys Trp

465 470 475 480

Phe Asp Tyr Leu Trp Thr Asn Lys Lys Thr Val Asp Glu Arg Glu Val
485 490 495

Leu Lys Asn Leu Pro Ala Lys Leu Arg Ala Glu Ile Ala Ile Asn Val
500 505 510

His Leu Ser Thr Leu Lys Lys Val Arg Ile Phe Gln Asp Cys Glu Ala
515 520 525

Gly Leu Leu Val Glu Leu Val Leu Lys Leu Arg Pro Gln Val Phe Ser
530 535 540

Pro Gly Asp Tyr Ile Cys Arg Lys Gly Asp Ile Gly Lys Glu Met Tyr
545 550 555 560

Ile Ile Lys Glu Gly Lys Leu Ala Val Val Ala Asp Asp Gly Val Thr
565 570 575

Gln Tyr Ala Leu Leu Ser Ala Gly Ser Cys Phe Gly Glu Ile Ser Ile
580 585 590

Leu Asn Ile Lys Gly Ser Lys Met Gly Asn Arg Arg Thr Ala Asn Ile
595 600 605

Arg Ser Leu Gly Tyr Ser Asp Leu Phe Cys Leu Ser Lys Asp Asp Leu
610 615 620

Met Glu Ala Val Thr Glu Tyr Pro Asp Ala Lys Lys Val Leu Glu Glu
625 630 635 640

Arg Gly Arg Glu Ile Leu Met Lys Glu Gly Leu Leu Asp Glu Asn Glu
645 650 655

Val Ala Ala Ser Met Glu Val Asp Val Gln Glu Lys Leu Lys Gln Leu
660 665 670

Glu Thr Asn Met Glu Thr Leu Tyr Thr Arg Phe Gly Arg Leu Leu Ala
675 680 685

Glu Tyr Thr Gly Ala Gln Gln Lys Leu Lys Gln Arg Ile Thr Val Leu
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Met Asn Ser Pro Glu Pro Ala Ala Glu Gln Pro
725 730

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<213> Bos taurus

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Arg Ala Ser Ser Arg Pro Gln Ser Ala Ala Ala Asp Asp Thr Ser Ser
35 40 45

Glu Leu Gln Gln Leu Ala Glu Met Asp Ala Pro Gln Gln Arg Arg Gly
50 55 60

Gly Phe Arg Arg Ile Ala Arg Leu Val Gly Val Leu Arg Glu Trp Ala
65 70 75 80

Tyr Arg Asn Phe Arg Glu Glu Pro Arg Pro Asp Ser Phe Leu Glu
85 90 95

Arg Phe Arg Gly Pro Glu Leu His Thr Val Thr Thr Gln Gln Gly Asp
100 105 110

Gly Lys Gly Asp Lys Asp Gly Glu Gly Lys Gly Thr Lys Lys Lys Phe
115 120 125

Glu Leu Phe Val Leu Asp Pro Ala Gly Asp Trp Tyr Tyr Arg Trp Leu
130 135 140

Phe Leu Ile Ala Leu Pro Val Leu Tyr Asn Trp Cys Leu Leu Val Ala
145 150 155 160

Arg Ala Cys Phe Ser Asp Leu Gln Lys Gly Tyr Tyr Ile Val Trp Leu
165 170 175

Val Leu Asp Tyr Val Ser Asp Val Val Tyr Ile Ala Asp Leu Phe Ile
180 185 190

Arg Leu Arg Thr Gly Phe Leu Glu Gln Gly Leu Leu Val Lys Asp Thr
195 200 205

Lys Lys Leu Arg Asp Asn Tyr Ile His Thr Met Gln Phe Lys Leu Asp
210 215 220

Val Ala Ser Ile Ile Pro Thr Asp Leu Ile Tyr Phe Ala Val Gly Ile
225 230 235 240

His Asn Pro Glu Val Arg Phe Asn Arg Leu Leu His Phe Ala Arg Met
245 250 255

Phe Glu Phe Phe Asp Arg Thr Glu Thr Arg Thr Ser Tyr Pro Asn Ile
260 265 270

Phe Arg Ile Ser Asn Leu Ile Leu Tyr Ile Leu Ile Ile His Trp
275 280 285

Asn Ala Cys Ile Tyr Tyr Ala Ile Ser Lys Ser Ile Gly Phe Gly Val
290 295 300

Asp Thr Trp Val Tyr Pro Asn Ile Thr Asp Pro Glu Tyr Gly Tyr Leu
305 310 315 320

Ser Arg Glu Tyr Ile Tyr Cys Leu Tyr Trp Ser Thr Leu Thr Leu Thr
325 330 335

Thr Ile Gly Glu Thr Pro Pro Pro Val Lys Asp Glu Glu Tyr Leu Phe
340 345 350

Val Ile Phe Asp Phe Leu Ile Gly Val Leu Ile Phe Ala Thr Ile Val
355 360 365

Gly Asn Val Gly Ser Met Ile Ser Asn Met Asn Ala Thr Arg Ala Glu
370 375 380

Phe Gln Ala Lys Ile Asp Ala Val Lys His Tyr Met Gln Phe Arg Lys
385 390 395 400

Val Ser Lys Glu Met Glu Ala Lys Val Ile Arg Trp Phe Asp Tyr Leu
405 410 415

Trp Thr Asn Lys Lys Ser Val Asp Glu Arg Glu Val Leu Lys Asn Leu
420 425 430

Pro Ala Lys Leu Arg Ala Glu Ile Ala Ile Asn Val His Leu Ser Thr
435 440 445

Leu Lys Lys Val Arg Ile Phe Gln Asp Cys Glu Ala Gly Leu Leu Val
450 455 460

Glu Leu Val Leu Lys Leu Arg Pro Gln Val Phe Ser Pro Gly Asp Tyr
465 470 475 480

Ile Cys Arg Lys Gly Asp Ile Gly Lys Glu Met Tyr Ile Ile Lys Glu
485 490 495

Gly Lys Leu Ala Val Val Ala Asp Asp Gly Val Thr Gln Tyr Ala Leu
500 505 510

Leu Ser Ala Gly Ser Cys Phe Gly Glu Ile Ser Ile Leu Asn Ile Lys
515 520 525

Gly Ser Lys Met Gly Asn Arg Arg Thr Ala Asn Ile Arg Ser Leu Gly
530 535 540

Tyr Ser Asp Leu Phe Cys Leu Ser Lys Asp Asp Leu Met Glu Ala Val
545 550 555 560

Thr Glu Tyr Pro Asp Ala Lys Arg Val Leu Glu Glu Arg Gly Arg Glu
565 570 575

Ile Leu Met Lys Glu Gly Leu Leu Asp Glu Asn Glu Val Ala Ala Ser
580 585 590

Met Glu Val Asp Val Gln Glu Lys Leu Glu Gln Leu Glu Thr Asn Met
595 600 605

Asp Thr Leu Tyr Thr Arg Phe Ala Arg Leu Leu Ala Glu Tyr Thr Gly
610 615 620

Ala Gln Gln Lys Leu Lys Gln Arg Ile Thr Val Leu Glu Thr Lys Met
625 630 635 640

Lys Gln Asn Asn Glu Asp Asp Ser Leu Ser Asp Gly Met Asn Ser Pro
645 650 655

Glu Pro Pro Ala Glu Lys Pro
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<212> PRT
<213> Mus musculus

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Met Met Thr Glu Lys Ser Asn Gly Val Lys Ser Ser Pro Ala Asn Asn
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His Asn His His Pro Pro Pro Ser Ile Lys Ala Asn Gly Lys Asp Asp
20 25 30

His Arg Ala Gly Ser Arg Pro Gln Ser Val Ala Ala Asp Asp Asp Thr
35 40 45

Ser Ser Glu Leu Gln Arg Leu Ala Glu Met Asp Thr Pro Arg Arg Gly
50 55 60

Arg Gly Gly Phe Arg Arg Ile Val Arg Leu Val Gly Ile Ile Arg Asp
65 70 75 80

Trp Ala Asn Lys Asn Phe Arg Glu Glu Pro Arg Pro Asp Ser Phe
85 90 95

Leu Glu Arg Phe Arg Gly Pro Glu Leu Gln Thr Val Thr Pro His Gln
100 105 110

Gly Asp Gly Lys Gly Asp Lys Asp Gly Glu Gly Lys Gly Thr Lys Lys
115 120 125

Lys Phe Glu Leu Phe Val Leu Asp Pro Ala Gly Asp Trp Tyr Tyr Arg
130 135 140

Trp Leu Phe Val Ile Ala Met Pro Val Leu Tyr Asn Trp Cys Leu Leu
145 150 155 160

Val Ala Arg Ala Cys Phe Ser Asp Leu Gln Arg Asn Tyr Phe Val Val
165 170 175

Trp Leu Val Leu Asp Tyr Phe Ser Asp Thr Val Tyr Ile Ala Asp Leu
180 185 190

Ile Ile Arg Leu Arg Thr Gly Phe Leu Glu Gln Gly Leu Leu Val Lys
195 200 205

Asp Pro Lys Lys Leu Arg Asp Asn Tyr Ile His Thr Leu Gln Phe Lys
210 215 220

Leu Asp Val Ala Ser Ile Ile Pro Thr Asp Leu Ile Tyr Phe Ala Val
225 230 235 240

Gly Ile His Ser Pro Glu Val Arg Phe Asn Arg Leu Leu His Phe Ala
245 250 255

Arg Met Phe Glu Phe Phe Asp Arg Thr Glu Thr Arg Thr Ser Tyr Pro
260 265 270

Asn Ile Phe Arg Ile Ser Asn Leu Val Leu Tyr Ile Leu Val Ile Ile
275 280 285

His Trp Asn Ala Cys Ile Tyr Tyr Ala Ile Ser Lys Ser Ile Gly Phe
290 295 300

Gly Val Asp Thr Trp Val Tyr Pro Asn Ile Thr Asp Pro Glu Tyr Gly
305 310 315 320

Tyr Leu Ala Arg Glu Tyr Ile Tyr Cys Leu Tyr Trp Ser Thr Leu Thr
325 330 335

Leu Thr Thr Ile Gly Glu Thr Pro Pro Pro Val Lys Asp Glu Glu Tyr
340 345 350

Leu Phe Phe Ile Phe Asp Phe Leu Ile Gly Val Leu Ile Phe Ala Thr
355 360 365

Ile Val Gly Asn Val Gly Ser Met Ile Ser Asn Met Asn Ala Thr Arg
370 375 380

Ala Glu Phe Gln Ala Lys Ile Asp Ala Val Lys His Tyr Met Gln Phe
385 390 395 400

Arg Lys Val Ser Lys Asp Met Glu Ala Lys Val Ile Lys Trp Phe Asp
405 410 415

Tyr Leu Trp Thr Asn Lys Lys Thr Val Asp Glu Arg Glu Val Leu Lys
420 425 430

Asn Leu Pro Ala Lys Leu Arg Ala Glu Ile Ala Ile Asn Val His Leu
435 440 445

Ser Thr Leu Lys Lys Val Arg Ile Phe Gln Asp Cys Glu Ala Gly Leu
450 455 460

Leu Val Glu Leu Val Leu Lys Leu Arg Pro Gln Val Phe Ser Pro Gly
465 470 475 480

Asp Tyr Ile Cys Arg Lys Gly Asp Ile Gly Lys Glu Met Tyr Ile Ile
485 490 495

Lys Glu Gly Lys Leu Ala Val Val Ala Asp Asp Gly Val Thr Gln Tyr
500 505 510

Ala Leu Leu Ser Ala Gly Ser Cys Phe Gly Glu Ile Ser Ile Leu Asn
515 520 525

Ile Lys Gly Ser Lys Met Gly Asn Arg Arg Thr Gly Thr Ile Arg Ser
530 535 540

Leu Gly Tyr Ser Asp Leu Phe Cys Leu Ser Lys Asp Asp Leu Met Glu
545 550 555 560

Ala Val Thr Glu Tyr Pro Asp Ala Lys Lys Val Leu Glu Glu Arg Gly
565 570 575

Arg Glu Ile Leu Met Lys Glu Gly Leu Leu Asp Glu Asn Glu Val Ala
580 585 590

Ala Ser Met Glu Val Asp Val Gln Glu Lys Leu Glu Gln Leu Glu Thr
595 600 605

Asn Met Glu Thr Leu Tyr Thr Arg Phe Ala Arg Leu Leu Ala Glu Tyr
610 615 620

Thr Gly Ala Gln Gln Lys Leu Lys Gln Arg Ile Thr Val Leu Glu Thr
625 630 635 640

Lys Met Lys Gln Asn His Glu Asp Asp Tyr Leu Ser Asp Gly Ile Asn
645 650 655

Thr Pro Glu Pro Ala Val Ala Glu
660

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<212> PRT

<213> Rattus norvegicus

<400> 18

Met Met Thr Glu Lys Ser Asn Gly Val Lys Ser Ser Pro Ala Asn Asn
1 5 10 15

His Asn His His Pro Pro Ser Ile Lys Ala Asn Gly Lys Asp Asp
20 25 30

His Arg Ala Gly Ser Arg Pro Gln Ser Val Ala Ala Asp Asp Asp Thr
35 40 45

Ser Pro Glu Leu Gln Arg Leu Ala Glu Met Asp Thr Pro Arg Arg Gly
50 55 60

Arg Gly Gly Phe Gln Arg Ile Val Arg Leu Val Gly Val Ile Arg Asp
65 70 75 80

Trp Ala Asn Lys Asn Phe Arg Glu Glu Pro Arg Pro Asp Ser Phe
85 90 95

Leu Glu Arg Phe Arg Gly Pro Glu Leu Gln Thr Val Thr Thr His Gln

100 105 110

Gly Asp Asp Lys Gly Gly Lys Asp Gly Glu Gly Lys Gly Thr Lys Lys
115 120 125

Lys Phe Glu Leu Phe Val Leu Asp Pro Ala Gly Asp Trp Tyr Tyr Arg
130 135 140

Trp Leu Phe Val Ile Ala Met Pro Val Leu Tyr Asn Trp Cys Leu Leu
145 150 155 160

Val Ala Arg Ala Cys Phe Ser Asp Leu Gln Arg Asn Tyr Phe Val Val
165 170 175

Trp Leu Val Leu Asp Tyr Phe Ser Asp Thr Val Tyr Ile Ala Asp Leu
180 185 190

Ile Ile Arg Leu Arg Thr Gly Phe Leu Glu Gln Gly Leu Leu Val Lys
195 200 205

Asp Pro Lys Lys Leu Arg Asp Asn Tyr Ile His Thr Leu Gln Phe Lys
210 215 220

Leu Asp Val Ala Ser Ile Ile Pro Thr Asp Leu Ile Tyr Phe Ala Val
225 230 235 240

Gly Ile His Ser Pro Glu Val Arg Phe Asn Arg Leu Leu His Phe Ala
245 250 255

Arg Met Phe Glu Phe Phe Asp Arg Thr Glu Thr Arg Thr Ser Tyr Pro
260 265 270

Asn Ile Phe Arg Ile Ser Asn Leu Val Leu Tyr Ile Leu Val Ile Ile
275 280 285

His Trp Asn Ala Cys Ile Tyr Tyr Val Ile Ser Lys Ser Ile Gly Phe
290 295 300

Gly Val Asp Thr Trp Val Tyr Pro Asn Ile Thr Asp Pro Glu Tyr Gly
305 310 315 320

Tyr Leu Ala Arg Glu Tyr Ile Tyr Cys Leu Tyr Trp Ser Thr Leu Thr
325 330 335

Leu Thr Thr Ile Gly Glu Thr Pro Pro Pro Val Lys Asp Glu Glu Tyr
340 345 350

Leu Phe Val Ile Phe Asp Phe Leu Ile Gly Val Leu Ile Phe Ala Thr
355 360 365

Ile Val Gly Asn Val Gly Ser Met Ile Ser Asn Met Asn Ala Thr Arg
370 375 380

Ala Glu Phe Gln Ala Lys Ile Asp Ala Val Lys His Tyr Met Gln Phe
385 390 395 400

Arg Lys Val Ser Lys Asp Met Glu Ala Lys Val Ile Lys Trp Phe Asp

405	410	415
Tyr Leu Trp Thr Asn Lys Lys Thr Val Asp Glu Arg Glu Val Leu Lys		
420	425	430
Asn Leu Pro Ala Lys Leu Arg Ala Glu Ile Ala Ile Asn Val His Leu		
435	440	445
Ser Thr Leu Lys Lys Val Arg Ile Phe Gln Asp Cys Glu Ala Gly Leu		
450	455	460
Leu Val Glu Leu Val Leu Lys Leu Arg Pro Gln Val Phe Ser Pro Gly		
465	470	475
Asp Tyr Ile Cys Arg Lys Gly Asp Ile Gly Lys Glu Met Tyr Ile Ile		
485	490	495
Lys Glu Gly Lys Leu Ala Val Val Ala Asp Asp Gly Val Thr Gln Tyr		
500	505	510
Ala Leu Leu Ser Ala Gly Ser Cys Phe Gly Glu Ile Ser Ile Leu Asn		
515	520	525
Ile Lys Gly Ser Lys Met Gly Asn Arg Arg Thr Ala Asn Ile Arg Ser		
530	535	540
Leu Gly Tyr Ser Asp Leu Phe Cys Leu Ser Lys Asp Asp Leu Met Glu		
545	550	555
Ala Val Thr Glu Tyr Pro Asp Ala Lys Lys Val Leu Glu Glu Arg Gly		
565	570	575
Arg Glu Ile Leu Met Lys Glu Gly Leu Leu Asp Glu Asn Glu Val Ala		
580	585	590
Ala Ser Met Glu Val Asp Val Gln Glu Lys Leu Glu Gln Leu Glu Thr		
595	600	605
Asn Met Asp Thr Leu Tyr Thr Arg Phe Ala Arg Leu Leu Ala Glu Tyr		
610	615	620
Thr Gly Ala Gln Gln Lys Leu Lys Gln Arg Ile Thr Val Leu Glu Thr		
625	630	635
Lys Met Lys Gln Asn His Glu Asp Asp Tyr Leu Ser Asp Gly Ile Asn		
645	650	655
Thr Pro Glu Pro Thr Ala Ala Glu		
660		
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gcagcagcgg ccgctactac tgctggctat ttgtcattg		

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36

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38

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36

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<212> DNA
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<222> (20)..(2011)

<400> 23
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Met Thr Glu Lys Thr Asn Gly Val Lys Ser Ser
1 5 10

52

cca gcc aat aat cac aac cat cat gca cct cct gcc atc aag gcc aat
Pro Ala Asn Asn His Asn His His Ala Pro Pro Ala Ile Lys Ala Asn
15 20 25

100

ggc aaa gat gac cac agg aca agc agc agg cca cac tct gca gct gac
Gly Lys Asp Asp His Arg Thr Ser Ser Arg Pro His Ser Ala Ala Asp
30 35 40

148

gat gac acc tcc tca gaa ctg cag agg ctg gca gac gtg gat gcc cca
Asp Asp Thr Ser Ser Glu Leu Gln Arg Leu Ala Asp Val Asp Ala Pro
45 50 55

196

cag cag gga agg agt ggc ttc cgc agg ata gtt cgc ctg gtg ggg atc
Gln Gln Gly Arg Ser Gly Phe Arg Arg Ile Val Arg Leu Val Gly Ile

244

60	65	70	75	
atc aga gaa tgg gcc aac aag aat ttc cga gag gag gaa cct agg cct Ile Arg Glu Trp Ala Asn Lys Asn Phe Arg Glu Glu Pro Arg Pro	80	85	90	292
gac tca ttc ctc gag cgt ttt cgt ggg cct gaa ctc cag act gtg acc Asp Ser Phe Leu Glu Arg Phe Arg Gly Pro Glu Leu Gln Thr Val Thr	95	100	105	340
aca cag gag ggg gat ggc aaa ggc gac aag gat ggc gag gac aaa ggc Thr Gln Glu Gly Asp Gly Lys Asp Lys Asp Gly Glu Asp Lys Gly	110	115	120	388
acc aag aag aaa ttt gaa cta ttt gtc ttg gac cca gct ggg gat ttg Thr Lys Lys Phe Glu Leu Phe Val Leu Asp Pro Ala Gly Asp Leu	125	130	135	436
tac tac tgc tgg cta ttt gtc att gcc atg ccc gtc ctt tac aac tgg Tyr Tyr Cys Trp Leu Phe Val Ile Ala Met Pro Val Leu Tyr Asn Trp	140	145	150	484
tgc ctg ctg gtg gcc aga gcc tgc ttc agt gac cta cag aaa ggc tac Cys Leu Leu Val Ala Arg Ala Cys Phe Ser Asp Leu Gln Lys Gly Tyr	160	165	170	532
tac ctg gtg tgg ctg gtg ctg gat tat gtc tca gat gtg gtc tac att Tyr Leu Val Trp Leu Val Leu Asp Tyr Val Ser Asp Val Val Tyr Ile	175	180	185	580
gcg gac ctc ttc atc cga ttg cgc aca ggt ttc ctg gag cag ggg ctg Ala Asp Leu Phe Ile Arg Leu Arg Thr Gly Phe Leu Glu Gln Gly Leu	190	195	200	628
ctg gtc aaa gat acc aag aaa ctg cga gac aac tac atc cac acc ctg Leu Val Lys Asp Thr Lys Leu Arg Asp Asn Tyr Ile His Thr Leu	205	210	215	676
cag ttc aag ctg gat gtg gct tcc atc atc ccc act gac ctg atc tat Gln Phe Lys Leu Asp Val Ala Ser Ile Ile Pro Thr Asp Leu Ile Tyr	220	225	230	724
ttt gct gtg gac atc cac agc cct gag gtg cgc ttc aac cgc ctg ctg Phe Ala Val Asp Ile His Ser Pro Glu Val Arg Phe Asn Arg Leu Leu	240	245	250	772
cac ttt gcc cgc atg ttt gag ttc ttt gac cgg aca gag aca cgc acc His Phe Ala Arg Met Phe Glu Phe Phe Asp Arg Thr Glu Thr Arg Thr	255	260	265	820
aac tac cct aac atc ttc cgc atc agc aac ctt gtc ctc tac atc ttg Asn Tyr Pro Asn Ile Phe Arg Ile Ser Asn Leu Val Leu Tyr Ile Leu	270	275	280	868
gtc atc atc cac tgg aat gcc tgc atc tat tat gcc atc tcc aaa tcc Val Ile Ile His Trp Asn Ala Cys Ile Tyr Tyr Ala Ile Ser Lys Ser	285	290	295	916

ata ggc ttt ggg gtc gac acc tgg gtt tac cca aac atc act gac cct Ile Gly Phe Gly Val Asp Thr Trp Val Tyr Pro Asn Ile Thr Asp Pro 300 305 310 315	964
gag tat ggc tac ctg gct agg gaa tac atc tat tgc ctt tac tgg tcc Glu Tyr Gly Tyr Leu Ala Arg Glu Tyr Ile Tyr Cys Leu Tyr Trp Ser 320 325 330	1012
aca ctg act ctc act acc att ggg gag aca cca ccc cct gta aag gat Thr Leu Thr Leu Thr Ile Gly Glu Thr Pro Pro Val Lys Asp 335 340 345	1060
gag gag tac cta ttt gtc atc ttt gac ttc ctg att ggc gtc ctc atc Glu Glu Tyr Leu Phe Val Ile Phe Asp Phe Leu Ile Gly Val Leu Ile 350 355 360	1108
ttt gcc acc atc gtg gga aat gtg ggc tcc atg atc tcc aac atg aat Phe Ala Thr Ile Val Gly Asn Val Gly Ser Met Ile Ser Asn Met Asn 365 370 375	1156
gcc acc cgg gca gag ttc cag gct aag atc gat gcc gtg aaa cac tac Ala Thr Arg Ala Glu Phe Gln Ala Lys Ile Asp Ala Val Lys His Tyr 380 385 390 395	1204
atg cag ttc cga aag gtc agc aag ggg atg gaa gcc aag gtc att agg Met Gln Phe Arg Lys Val Ser Lys Gly Met Glu Ala Lys Val Ile Arg 400 405 410	1252
tgg ttt gac tac ttg tgg acc aat aag aag aca gtg gat gag cga gaa Trp Phe Asp Tyr Leu Trp Thr Asn Lys Lys Thr Val Asp Glu Arg Glu 415 420 425	1300
att ctc aag aat ctg cca gcc aag ctc agg gct gag ata gcc atc aat Ile Leu Lys Asn Leu Pro Ala Lys Leu Arg Ala Glu Ile Ala Ile Asn 430 435 440	1348
gtc cac ttg tcc aca ctc aag aaa gtg cgc atc ttc cat gat tgt gag Val His Leu Ser Thr Leu Lys Lys Val Arg Ile Phe His Asp Cys Glu 445 450 455	1396
gct ggc ctg ctg gta gag ctg gta ctg aaa ctc cgt cct cag gtc ttc Ala Gly Leu Leu Val Glu Leu Val Leu Lys Leu Arg Pro Gln Val Phe 460 465 470 475	1444
agt cct ggg gat tac att tgc cgc aaa ggg gac atc ggc aag gag atg Ser Pro Gly Asp Tyr Ile Cys Arg Lys Gly Asp Ile Gly Lys Glu Met 480 485 490	1492
tac atc att aag gag ggc aaa ctg gca gtg gtg gct gat gat ggt gtg Tyr Ile Ile Lys Glu Gly Lys Leu Ala Val Val Ala Asp Asp Gly Val 495 500 505	1540
act cag tat gct ctg ctg gct gga agc tgc ttt ggc gag atc agt Thr Gln Tyr Ala Leu Leu Ser Ala Gly Ser Cys Phe Gly Glu Ile Ser 510 515 520	1588

atc ctt aac att aag ggc agt aaa atg ggc aat cga cgc aca gct aat Ile Leu Asn Ile Lys Gly Ser Lys Met Gly Asn Arg Arg Thr Ala Asn	525	530	535	1636
atc cgc agc ctg ggc tac tca gat ctc ttc tgc ttg tcc aag gat gat Ile Arg Ser Leu Gly Tyr Ser Asp Leu Phe Cys Leu Ser Lys Asp Asp	540	545	550	555
ctt atg gaa gct gtg act gag tac cct gat gcc aag aaa gtc cta gaa Leu Met Glu Ala Val Thr Glu Tyr Pro Asp Ala Lys Lys Val Leu Glu	560	565	570	1732
gag agg ggt cgg gag atc ctc atg aag gag gga ctg ctg gat gag aac Glu Arg Gly Arg Glu Ile Leu Met Lys Glu Gly Leu Leu Asp Glu Asn	575	580	585	1780
gaa gtg gca acc agc atg gag gtc gac gtg cag gag aag cta ggg cag Glu Val Ala Thr Ser Met Glu Val Asp Val Gln Glu Lys Leu Gly Gln	590	595	600	1828
ctg gag acc aac atg gaa acc ttg tac act cgc ttt ggc cgc ctg ctg Leu Glu Thr Asn Met Glu Thr Leu Tyr Thr Arg Phe Gly Arg Leu Leu	605	610	615	1876
gct gag tac acg ggg gcc cag cag aag ctc aag cag cgc atc aca gtt Ala Glu Tyr Thr Gly Ala Gln Gln Lys Leu Lys Gln Arg Ile Thr Val	620	625	630	635
ctg gaa acc aag atg aaa cag aac aat gaa gat gac tac ctg tct gat Leu Glu Thr Lys Met Lys Gln Asn Asn Glu Asp Asp Tyr Leu Ser Asp	640	645	650	1972
ggg atg aac agc cct gag ctg gct gct gac gag cca taagacctgg Gly Met Asn Ser Pro Glu Leu Ala Ala Asp Glu Pro	655	660		2021
ggcccaactg cctctccagc attggccttg gccttgatcc cagaagctag aggagctatt				2081
tagatctccg gatttacatg cattaccctc atgttccctg aattctccca aaaggctctc				2141
tgaccctggg ttttggcct aaacatccaa gattccgcct cggatcccg				2190
<210> 24				
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<213> Homo sapiens				
<400> 24				
Met Thr Glu Lys Thr Asn Gly Val Lys Ser Ser Pro Ala Asn Asn His				
1	5	10	15	
Asn His His Ala Pro Pro Ala Ile Lys Ala Asn Gly Lys Asp Asp His				
20	25	30		

Arg Thr Ser Ser Arg Pro His Ser Ala Ala Asp Asp Asp Thr Ser Ser
35 40 45

Glu Leu Gln Arg Leu Ala Asp Val Asp Ala Pro Gln Gln Gly Arg Ser
50 55 60

Gly Phe Arg Arg Ile Val Arg Leu Val Gly Ile Ile Arg Glu Trp Ala
65 70 75 80

Asn Lys Asn Phe Arg Glu Glu Glu Pro Arg Pro Asp Ser Phe Leu Glu
85 90 95

Arg Phe Arg Gly Pro Glu Leu Gln Thr Val Thr Thr Gln Glu Gly Asp
100 105 110

Gly Lys Gly Asp Lys Asp Gly Glu Asp Lys Gly Thr Lys Lys Lys Phe
115 120 125

Glu Leu Phe Val Leu Asp Pro Ala Gly Asp Leu Tyr Tyr Cys Trp Leu
130 135 140

Phe Val Ile Ala Met Pro Val Leu Tyr Asn Trp Cys Leu Leu Val Ala
145 150 155 160

Arg Ala Cys Phe Ser Asp Leu Gln Lys Gly Tyr Tyr Leu Val Trp Leu
165 170 175

Val Leu Asp Tyr Val Ser Asp Val Val Tyr Ile Ala Asp Leu Phe Ile
180 185 190

Arg Leu Arg Thr Gly Phe Leu Glu Gln Gly Leu Leu Val Lys Asp Thr
195 200 205

Lys Lys Leu Arg Asp Asn Tyr Ile His Thr Leu Gln Phe Lys Leu Asp
210 215 220

Val Ala Ser Ile Ile Pro Thr Asp Leu Ile Tyr Phe Ala Val Asp Ile
225 230 235 240

His Ser Pro Glu Val Arg Phe Asn Arg Leu Leu His Phe Ala Arg Met
245 250 255

Phe Glu Phe Phe Asp Arg Thr Glu Thr Arg Thr Asn Tyr Pro Asn Ile
260 265 270

Phe Arg Ile Ser Asn Leu Val Leu Tyr Ile Leu Val Ile Ile His Trp
275 280 285

Asn Ala Cys Ile Tyr Tyr Ala Ile Ser Lys Ser Ile Gly Phe Gly Val
290 295 300

Asp Thr Trp Val Tyr Pro Asn Ile Thr Asp Pro Glu Tyr Gly Tyr Leu
305 310 315 320

Ala Arg Glu Tyr Ile Tyr Cys Leu Tyr Trp Ser Thr Leu Thr Leu Thr
325 330 335

Thr Ile Gly Glu Thr Pro Pro Val Lys Asp Glu Glu Tyr Leu Phe
340 345 350

Val Ile Phe Asp Phe Leu Ile Gly Val Leu Ile Phe Ala Thr Ile Val
355 360 365

Gly Asn Val Gly Ser Met Ile Ser Asn Met Asn Ala Thr Arg Ala Glu
370 375 380

Phe Gln Ala Lys Ile Asp Ala Val Lys His Tyr Met Gln Phe Arg Lys
385 390 395 400

Val Ser Lys Gly Met Glu Ala Lys Val Ile Arg Trp Phe Asp Tyr Leu
405 410 415

Trp Thr Asn Lys Lys Thr Val Asp Glu Arg Glu Ile Leu Lys Asn Leu
420 425 430

Pro Ala Lys Leu Arg Ala Glu Ile Ala Ile Asn Val His Leu Ser Thr
435 440 445

Leu Lys Lys Val Arg Ile Phe His Asp Cys Glu Ala Gly Leu Leu Val
450 455 460

Glu Leu Val Leu Lys Leu Arg Pro Gln Val Phe Ser Pro Gly Asp Tyr
465 470 475 480

Ile Cys Arg Lys Gly Asp Ile Gly Lys Glu Met Tyr Ile Ile Lys Glu

485

490

495

Gly Lys Leu Ala Val Val Ala Asp Asp Gly Val Thr Gln Tyr Ala Leu
500 505 510

Leu Ser Ala Gly Ser Cys Phe Gly Glu Ile Ser Ile Leu Asn Ile Lys
515 520 525

Gly Ser Lys Met Gly Asn Arg Arg Thr Ala Asn Ile Arg Ser Leu Gly
530 535 540

Tyr Ser Asp Leu Phe Cys Leu Ser Lys Asp Asp Leu Met Glu Ala Val
545 550 555 560

Thr Glu Tyr Pro Asp Ala Lys Lys Val Leu Glu Glu Arg Gly Arg Glu
565 570 575

Ile Leu Met Lys Glu Gly Leu Leu Asp Glu Asn Glu Val Ala Thr Ser
580 585 590

Met Glu Val Asp Val Gln Glu Lys Leu Gly Gln Leu Glu Thr Asn Met
595 600 605

Glu Thr Leu Tyr Thr Arg Phe Gly Arg Leu Leu Ala Glu Tyr Thr Gly
610 615 620

Ala Gln Gln Lys Leu Lys Gln Arg Ile Thr Val Leu Glu Thr Lys Met
625 630 635 640

Lys Gln Asn Asn Glu Asp Asp Tyr Leu Ser Asp Gly Met Asn Ser Pro
645 650 655

Glu Leu Ala Ala Ala Asp Glu Pro
660